Mrs. Hayden

Name Key Date

Applications of Polynomial Equations--HW

1. Last year, the SportsTime Athletic Club charged $20 to participate in an aerobics class. Seventy people attended the classes. The club wants to increase the class price this year. They expect to lose one customer for each $1 increase in the price. What should the club charge to maximize the income and what is the maximum income they can expect?

$I(x) = (70-x)(20+x)$ $x=25$

$= 1400 + 50x - x^2$

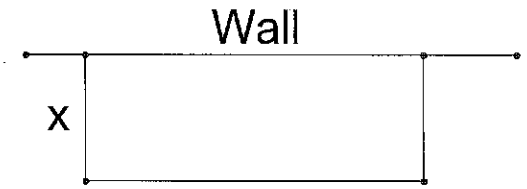
$45 $2025

2. A ball is thrown vertically upward with an initial speed of 80ft/sec. Its height after t seconds is given by the equation: $h = 80t - 16t^2$. What is the maximum height of the ball? $\frac{-80}{-32} = 2.5$ sec

100ft

3. A pen is to be built along a wall from 72 m of fencing. Determine the value of x that maximizes the area that will be enclosed.

$A(x) = x(72-2x)$



x=18m

4. The SGA plans to run a talent show to raise money. Last year, tickets sold for $5 each and 300 people attended. This year, they want to make a bigger profit. They estimate that for each $1 increase in price, attendance will drop by 20 people. What should the SGA charge to maximize the profit?

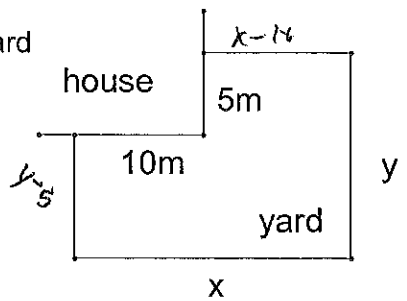
$P(x) = (300-20x)(5+x)$ $x=5$

$= 1500 + 200x - 20x^2$ $10

5. If an object is thrown vertically upward with a velocity of 29.4 m/s from a height of 30m, then its height h above the ground in meters after t seconds is given by $h = 30 + 29.4t - 4.9t^2$. What is the maximum height the object will reach?

$V(3, 74.1)$ 74.1m $\frac{-29.4}{2(-4.9)} = 3$

6. **Sixty** meters of fencing material is to be used to build a play yard around the corner of a house as shown. What should the dimensions x and y be in order that area of the yard be a maximum?



$A(x) = xy - 50$

$x(37.5 - x) - 50$

$= 37.5x - x^2 - 50$

$x = 18.75$ m

$60 = 2x - 10 + 2y - 5$

$75 = 2x + 2y$

$37.5 = x + y$

$37.5 - x = y$

18.75 m $= y$